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DINOSAURS!

•DISCOVER THE GIANTS OF THE PREH RLD•

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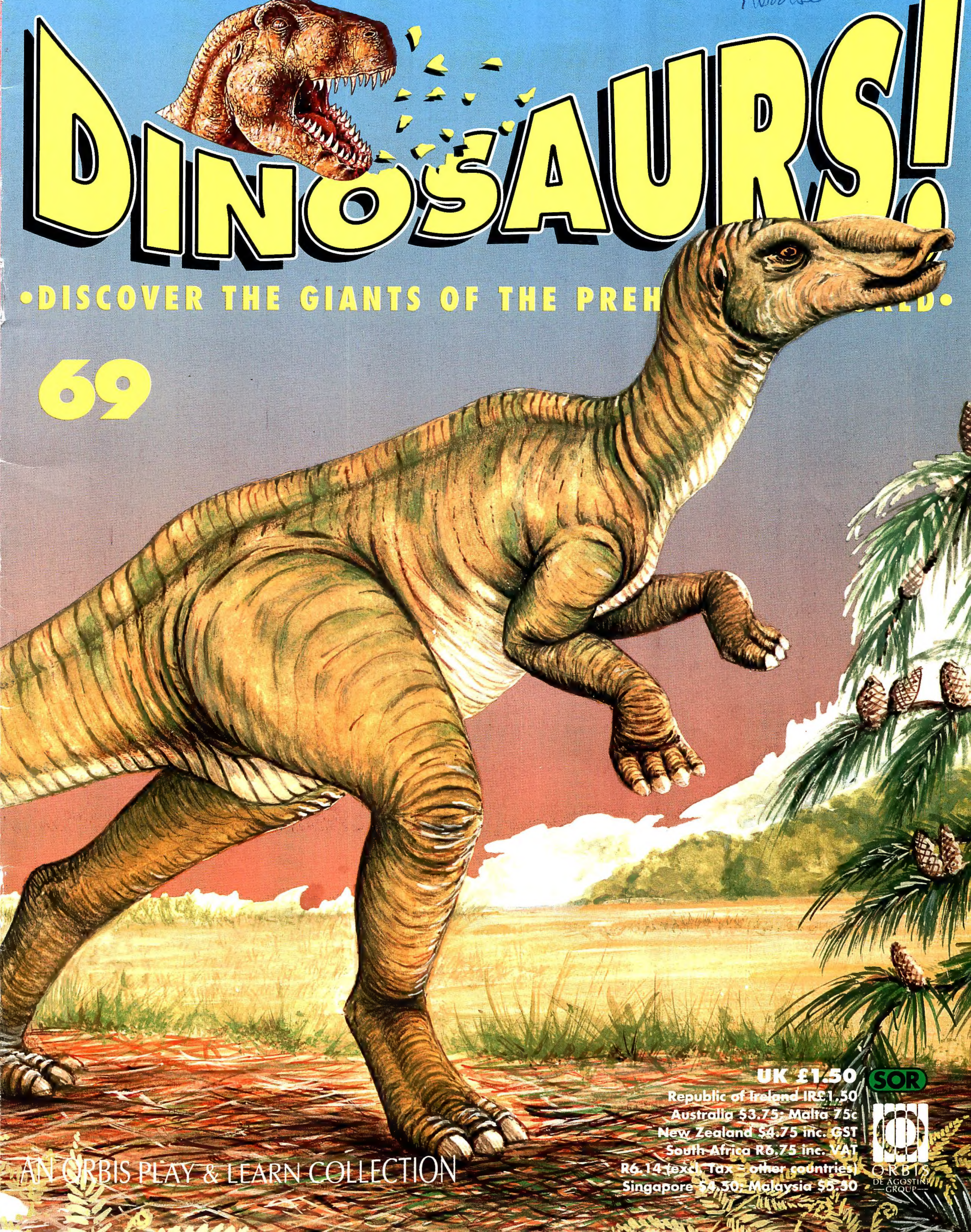

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• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

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SECERNOSAURUS

This duckbilled hadrosaur lived in South America, a long way from most of its North American relatives.

Secernosaurus was the first hadrosaur to be found in South America, although fossils of *Kritosaurus* have since been found in a region called Patagonia. Most other hadrosaurs have been found far away to the north. This is why *Secernosaurus* was named 'separate reptile'. Although the fossils of this dinosaur were discovered in 1923, it lay unnoticed in a museum for 56 years. Eventually it was studied, described and given its name by the American palaeontologist Mike Brett Surman.

SMALLER THAN AVERAGE

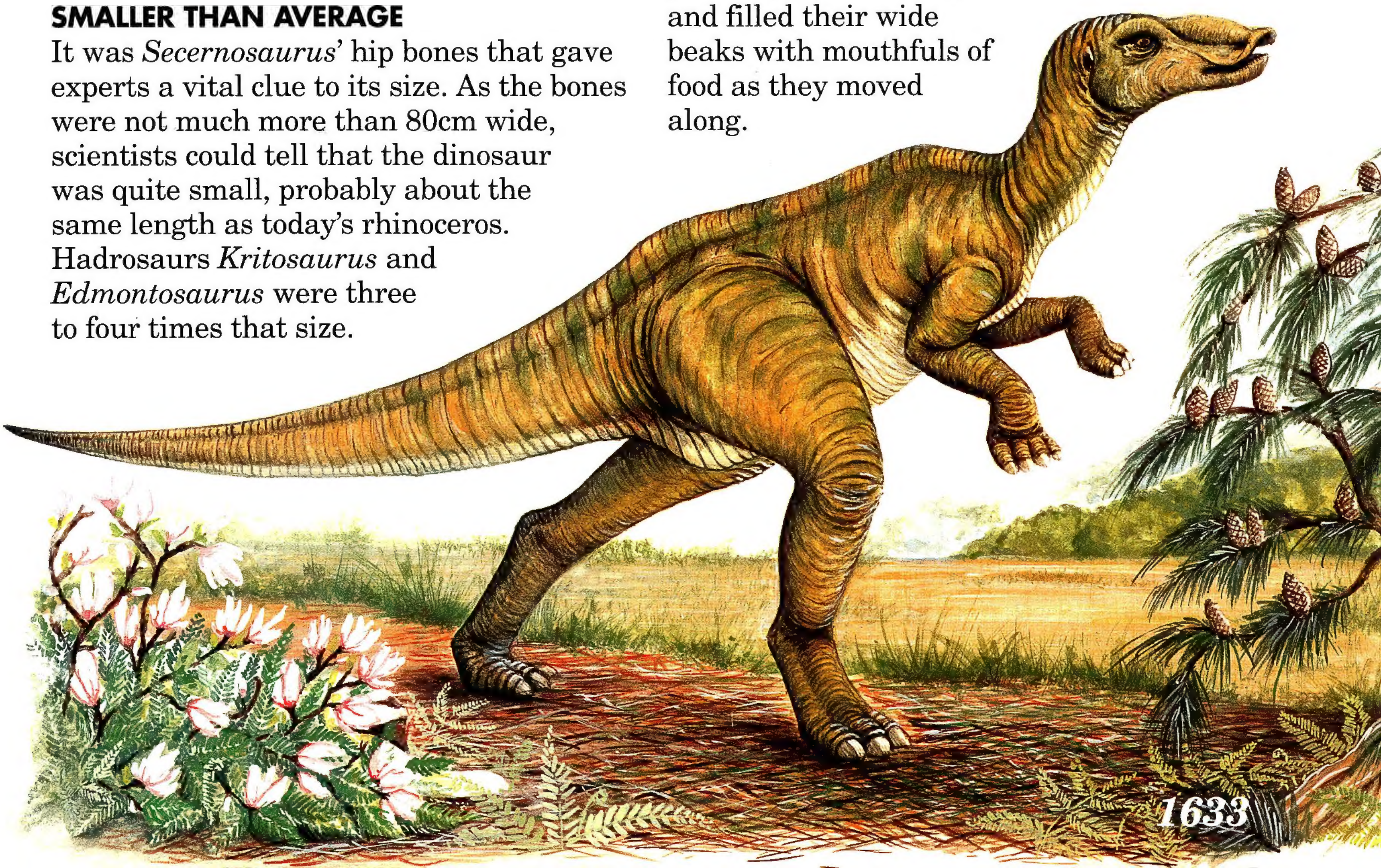
It was *Secernosaurus*' hip bones that gave experts a vital clue to its size. As the bones were not much more than 80cm wide, scientists could tell that the dinosaur was quite small, probably about the same length as today's rhinoceros. Hadrosaurs *Kritosaurus* and *Edmontosaurus* were three to four times that size.

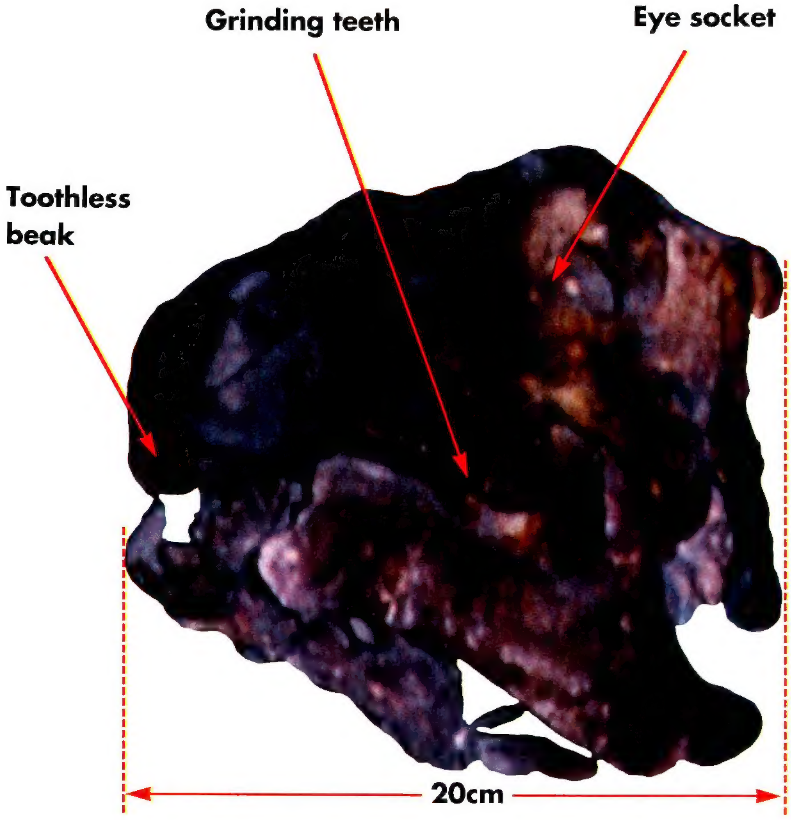
BIG SPLASH

The deep tails and paddle-like hands of hadrosaurs suggest that they could swim. Without armour or sharp claws for protection, *Secernosaurus* had to run away when a predator appeared. By plunging into deep water it was safe from attack. Some experts believe that *Secernosaurus* migrated to South America from North America. *Secernosaurus* would have been able to swim across any areas of water it met during this long journey.

ROUGH AND READY

Secernosaurus had broad rows of self-sharpening cheek teeth to crush and slice up mouthfuls of rough and chewy vegetation. Large herds of hadrosaurs probably travelled together and filled their wide beaks with mouthfuls of food as they moved along.





No one has yet discovered a complete *Secernosaurus* skull. This is the skull of a *Probactrosaurus*, which experts think was similar to that of *Secernosaurus*.

FLAT HEAD

Although only the back part of *Secernosaurus*' skull was found in Argentina in 1923, it was enough to show scientists that, unlike other hadrosaurs such as *Lambeosaurus* and *Bactrosaurus*, it did not have a head crest.

BLOW YOUR OWN TRUMPET

Secernosaurus may have had a nose sac like *Edmontosaurus*. Animals often make sounds to communicate with each other. When *Edmontosaurus* called and bellowed, it inflated its nose sac. This made the sound much louder, as it echoed around the sac. Imagine a whole herd of dinosaurs calling to each other at sunrise – like a deafening dawn chorus!

AMONG THE FLOWERS

Today, the lush, steamy rainforests of South America contain a vast range of exotic and colourful plants. During the Late Cretaceous Period in Argentina, when *Secernosaurus* was alive, the first flowers ever seen on Earth began to bloom.

LOTS TO EAT

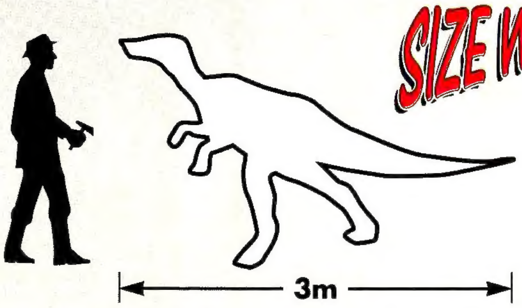
Secernosaurus was fortunate to have a very wide choice of food. It ambled along among the coniferous trees and the ferns using its sharp back teeth to munch up pine needles, twigs and seeds, as well as the new flowering plants.

IT'S A FACT

SOME DINOSAUR BONES ARE STILL WAITING TO BE STUDIED

There may be other 'new' dinosaurs, like *Secernosaurus*, lying unnoticed among the thousands of fossils stored in museums around the world. Carefully labelled and encased in plaster, these bones await the attention of scientists. One museum in Utah, USA, has 100 tonnes of bones waiting to be described.

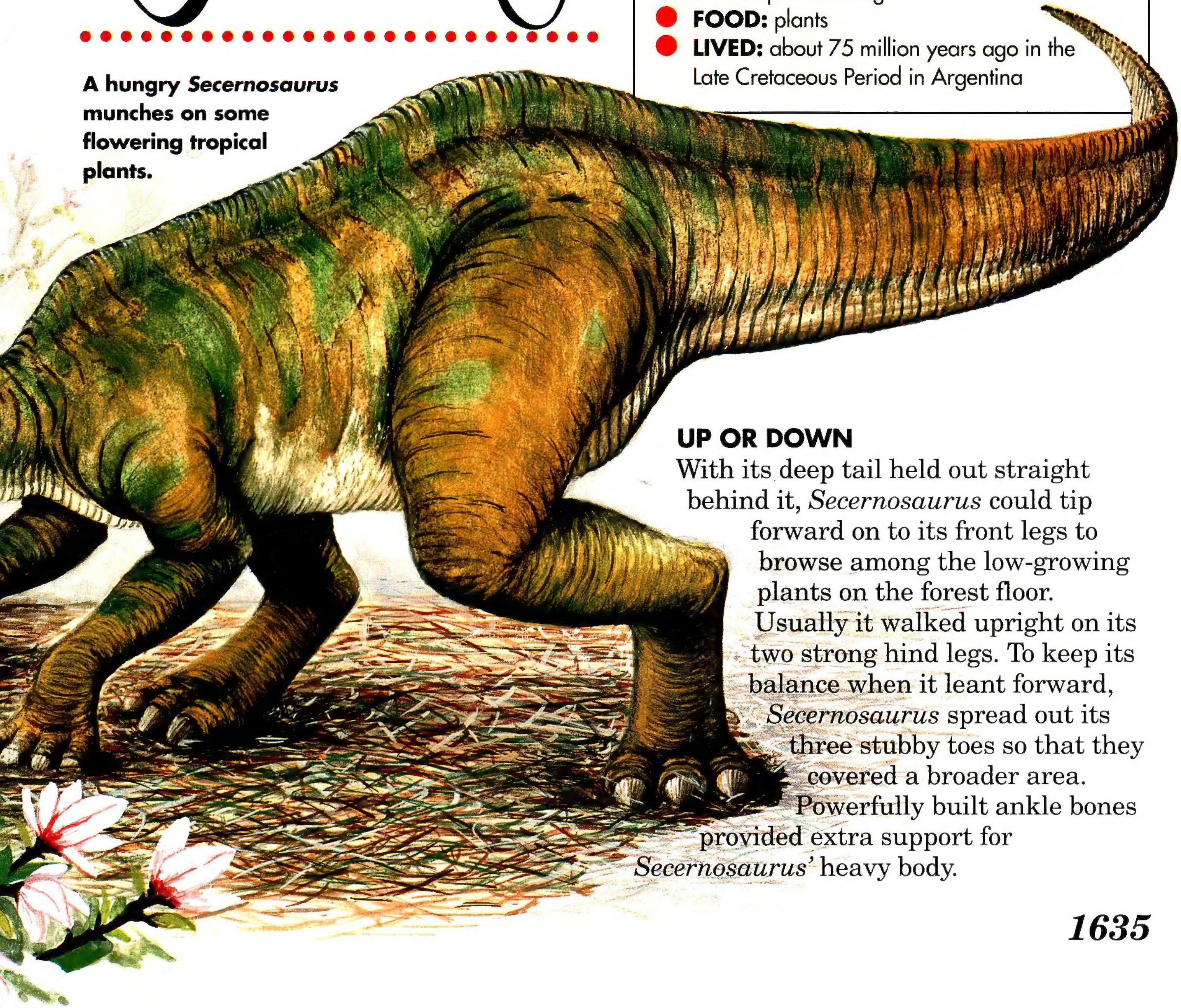
SIZE WISE



MONSTER FACTS

- **NAME:** *Secernosaurus* (se-ser-no-saw-rus) means 'separate reptile'
- **GROUP:** dinosaur
- **SIZE:** up to 3m long
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in Argentina

A hungry *Secernosaurus* munches on some flowering tropical plants.



UP OR DOWN

With its deep tail held out straight behind it, *Secernosaurus* could tip forward on to its front legs to browse among the low-growing plants on the forest floor. Usually it walked upright on its two strong hind legs. To keep its balance when it leant forward, *Secernosaurus* spread out its three stubby toes so that they covered a broader area. Powerfully built ankle bones provided extra support for *Secernosaurus*' heavy body.

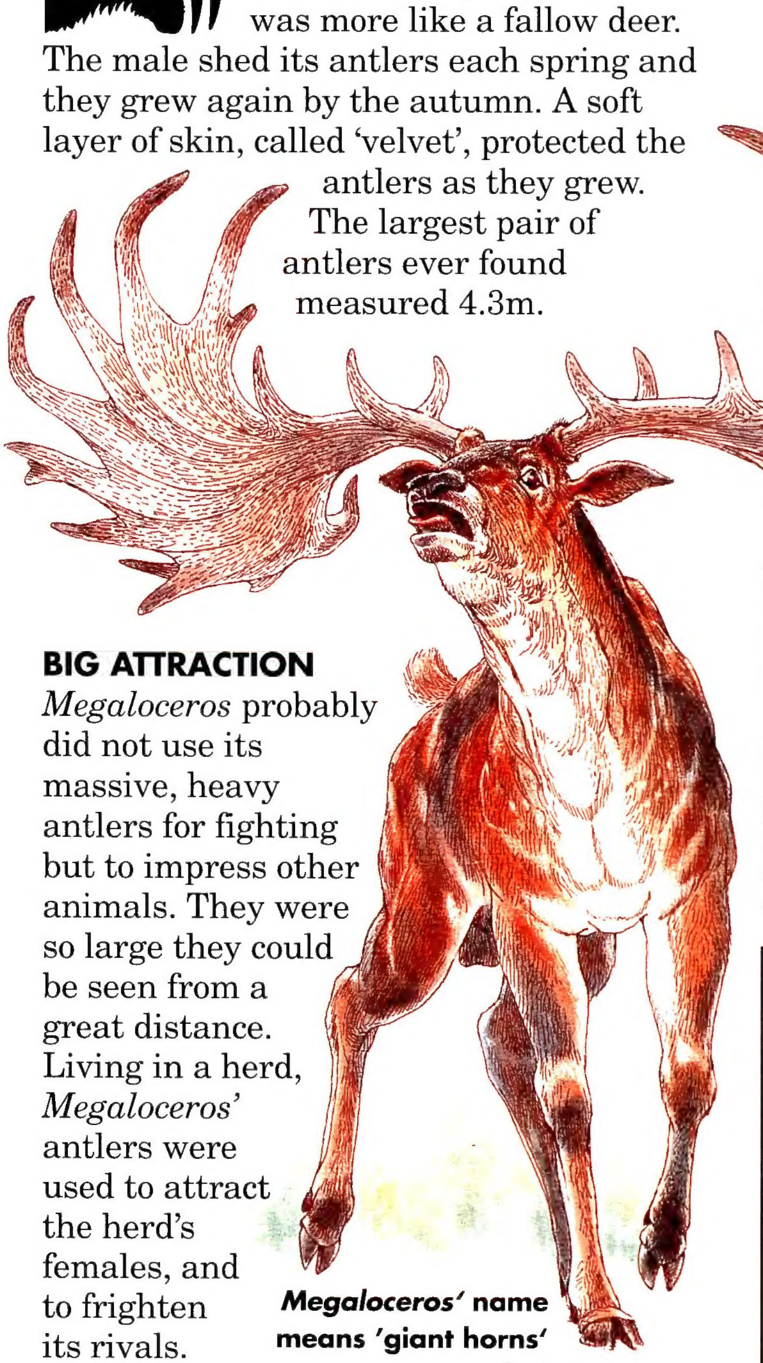
MEGALOCEROS

***Megaloceros*' amazing antlers were designed to make a big impression.**

Although it is sometimes called the 'Irish Elk', *Megaloceros* was more like a fallow deer. The male shed its antlers each spring and they grew again by the autumn. A soft layer of skin, called 'velvet', protected the antlers as they grew. The largest pair of antlers ever found measured 4.3m.

STRONG AND GRACEFUL

Megaloceros browsed on shrubs and trees in the woods and forests of Pleistocene Europe and Asia. Its strong, thick neck helped support its heavy head. When danger threatened, *Megaloceros* loped away on its slender, graceful legs.

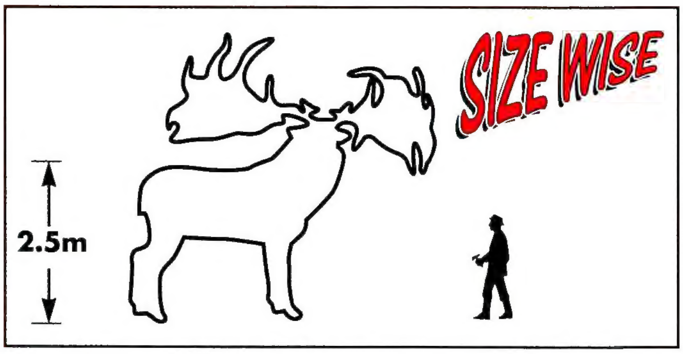


BIG ATTRACTION

Megaloceros probably did not use its massive, heavy antlers for fighting but to impress other animals. They were so large they could be seen from a great distance. Living in a herd, *Megaloceros*' antlers were used to attract the herd's females, and to frighten its rivals.

***Megaloceros'* name means 'giant horns' – you can see why!**

SIZE WISE



MONSTER FACTS

- **NAME:** *Megaloceros* (meg-al-oh-seer-os) means 'giant horns'
- **GROUP:** mammal
- **SIZE:** shoulder height about 2.5m
- **FOOD:** plants
- **LIVED:** about 20,000 years ago in Pleistocene times in northern Europe and Asia

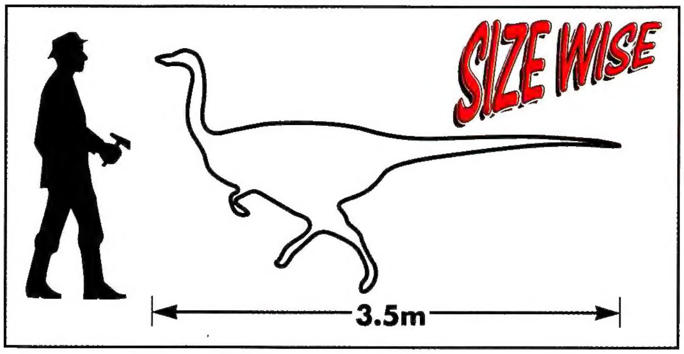
ELAPHROSAURUS

***Elaphrosaurus* may have been an ancestor of ostrich dinosaurs like *Struthiomimus*.**

Found in rich fossil beds in Tendaguru, Tanzania, the remains of *Elaphrosaurus* did not include a head. Even without this vital clue, experts were able to see many similarities between this theropod and the ornithomimosaurs that lived about 70 million years later. *Elaphrosaurus* shared its home in eastern Africa with huge plant-eaters like *Barosaurus* and *Brachiosaurus*.

NOT SO FAST

Elaphrosaurus stood on two legs with its tail held out stiffly behind its body. Its bones were hollow and this lightweight frame enabled *Elaphrosaurus* to move nimbly. However, experts think that in a race against *Dromiceiomimus,* one of the later, speedy ostrich dinosaurs, it would certainly have come second!

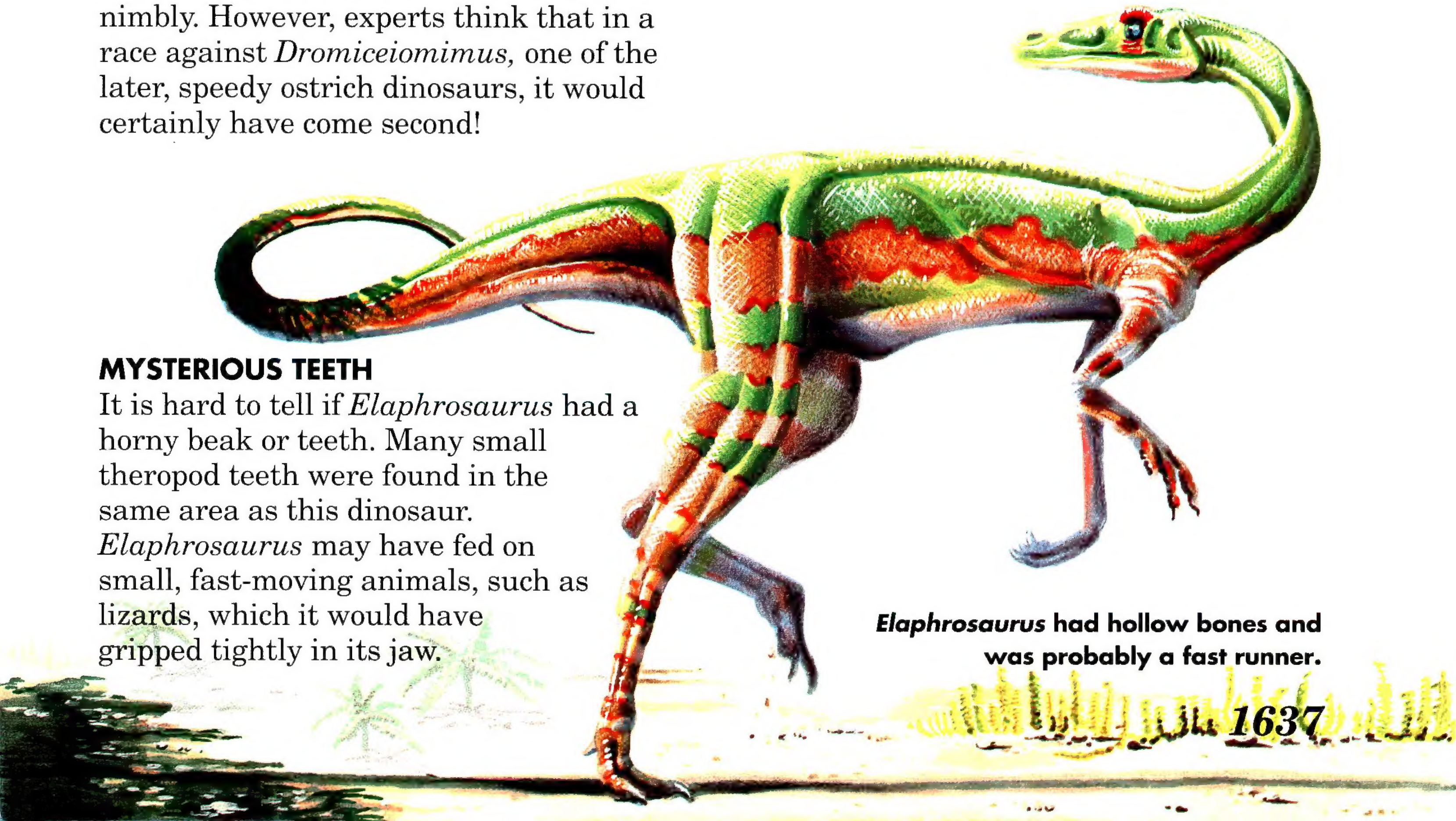


MONSTER FACTS

- **NAME:** *Elaphrosaurus* (ee-laf-roe-saw-rus) means 'lightweight reptile'
- **GROUP:** dinosaur
- **SIZE:** up to 3.5m long
- **FOOD:** small mammals, insects
- **LIVED:** about 150 million years ago in the Late Jurassic Period in Tanzania, Africa

MYSTERIOUS TEETH

It is hard to tell if *Elaphrosaurus* had a horny beak or teeth. Many small theropod teeth were found in the same area as this dinosaur. *Elaphrosaurus* may have fed on small, fast-moving animals, such as lizards, which it would have gripped tightly in its jaw.



***Elaphrosaurus* had hollow bones and was probably a fast runner.**

At home on land

In the desert-like world of the Permian Period, 290 to 245 million years ago, more and more animals adapted to life out of water.

During the drier Permian Period seas drew back and left more land exposed. Great deserts appeared. The soft, lush vegetation that grew in the swamplands during the Carboniferous was replaced by stringier plants that were harder to digest. Vast forests of firs and tall pine trees grew.

RED BEDS

Perm is a place in Russia where many fossils have been found. The Permian Period takes its name from Perm but many discoveries from that time have been made in other parts of the world. Some of the most exciting finds come from South Africa and the 'red beds' of Texas, USA.

ON TO LAND

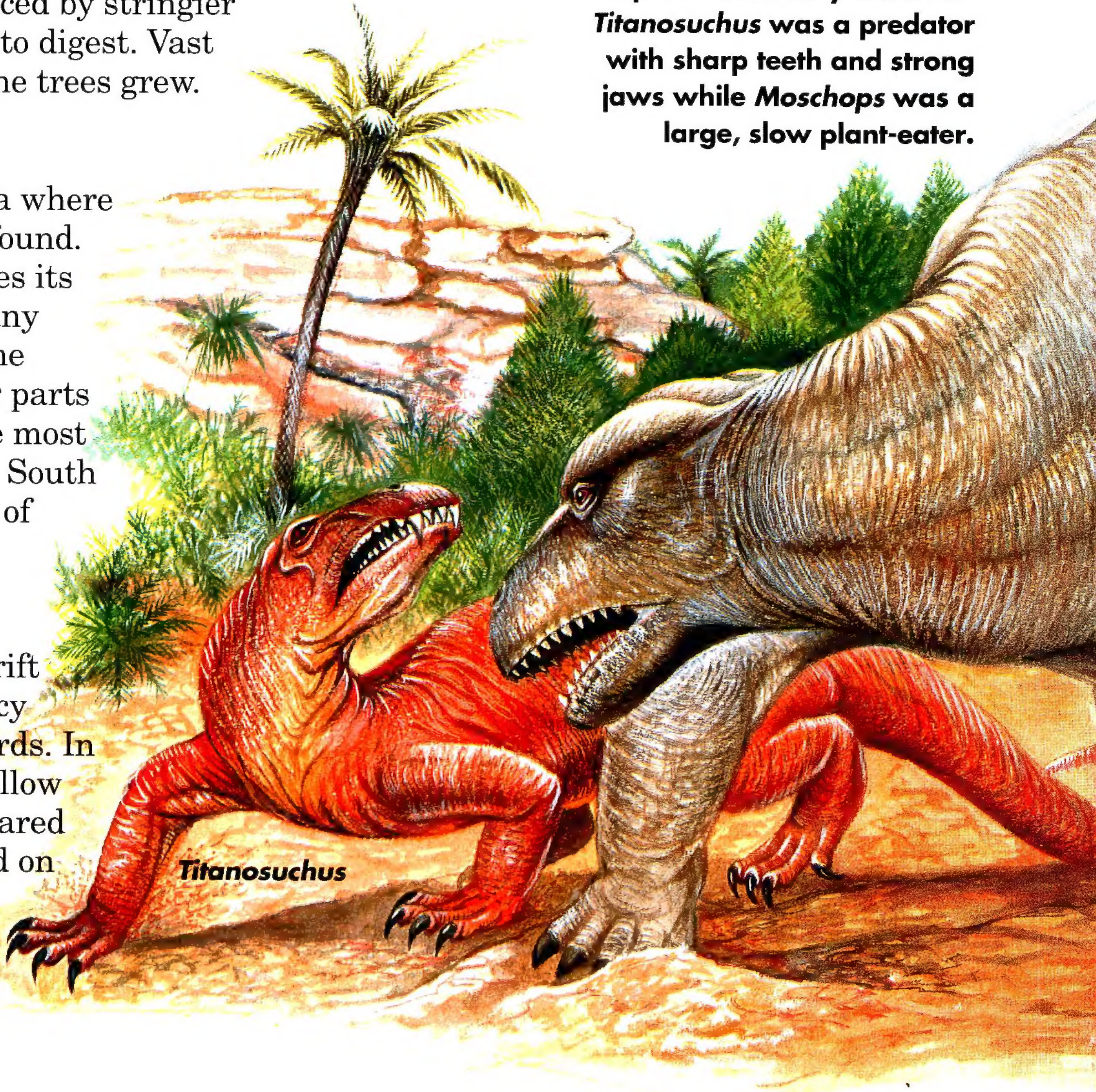
Land masses began to drift towards the north, and icy glaciers shifted southwards. In this changing world, shallow ponds and lakes disappeared and some animals moved on to land and made their homes there.

NEW FREEDOM

Like reptiles of today, they laid their eggs on land and had waterproof skins. As they no longer needed to lay eggs in water, these animals could leave the swamps and enjoy the freedom of living on dry land. Among the most successful of these new groups were the mammal-like reptiles.

DIFFERENT DINNERS

One special group of early mammal-like reptiles were the pelycosaurs, including some amazing sail-back reptiles. There was *Edaphrosaurus*, a herbivore with blunt, peg-like teeth and a skin-covered sail on its back. *Dimetrodon* also had a tall sail but it was a flesh-eater, with sharp teeth set in a curved jaw.



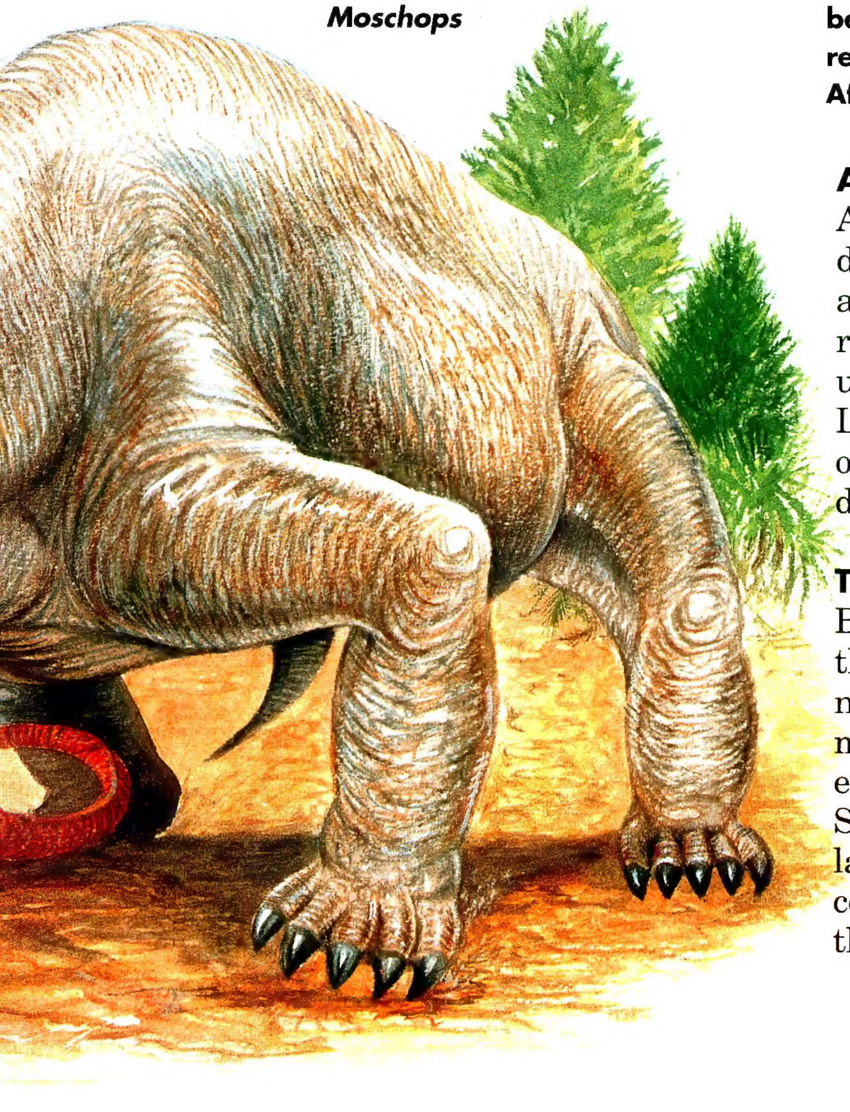
These two mammal-like reptiles were very different. *Titanosuchus* was a predator with sharp teeth and strong jaws while *Moschops* was a large, slow plant-eater.

Is it true that red beds are red ?

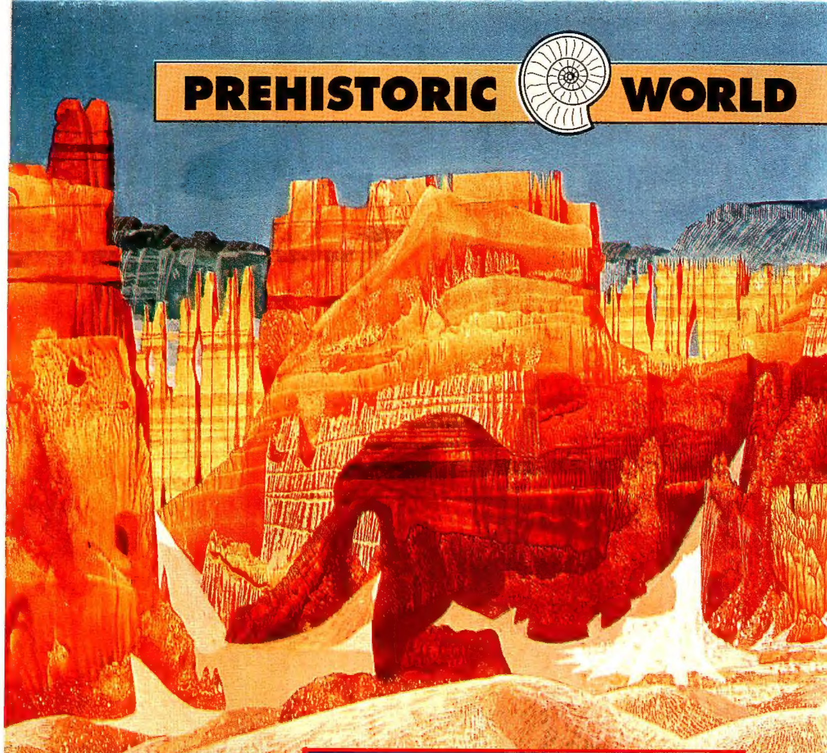
Yes. The 'red beds' of Texas and Oklahoma in the USA and the Karroo Basin of South Africa take their name from the red colour of the sandstones and mudstones which are found there. These beds reveal the many animals that lived there during the Permian Period.

BIG AND HUNGRY

A huge variety of mammal-like reptiles ruled the Late Permian world. Some were as small as mice while others plodded around like hefty hippos. *Moschops* was a plant-eater which ate large quantities of primitive shrubs. *Titanosuchus* belonged to the same family but ate meat, killing its prey with fang-like teeth.



Moschops



The picture above shows what Permian rock looked like. Many fossils have been found in these red rocks in South Africa, shown right.

ABOVE AND BELOW THE LAND

As mammal-like reptiles took over the dry landscape, some animals took to the air and the sea. *Weigeltisaurus* was a reptile that could glide from tree to tree using its skin-covered ribs as wings. Lizard-like *Hovasaurus* was able to move on land but fed on fish and used its long, deep tail to propel itself through water.

THE GREAT DYING OFF

But in spite of their success, many of these animals disappeared forever. We do not know what catastrophe killed off so many creatures, how long this mass extinction took, or why it happened. Scientists think that up to 50 per cent of land animals and plants and over 80 per cent of sea creatures became extinct by the end of the Permian Period.

The earth recovers

In the Triassic Period, 245-208 million years ago, the animal kingdom began to recover from the shock of mass extinction. By the end of the Triassic, dinosaurs had appeared.

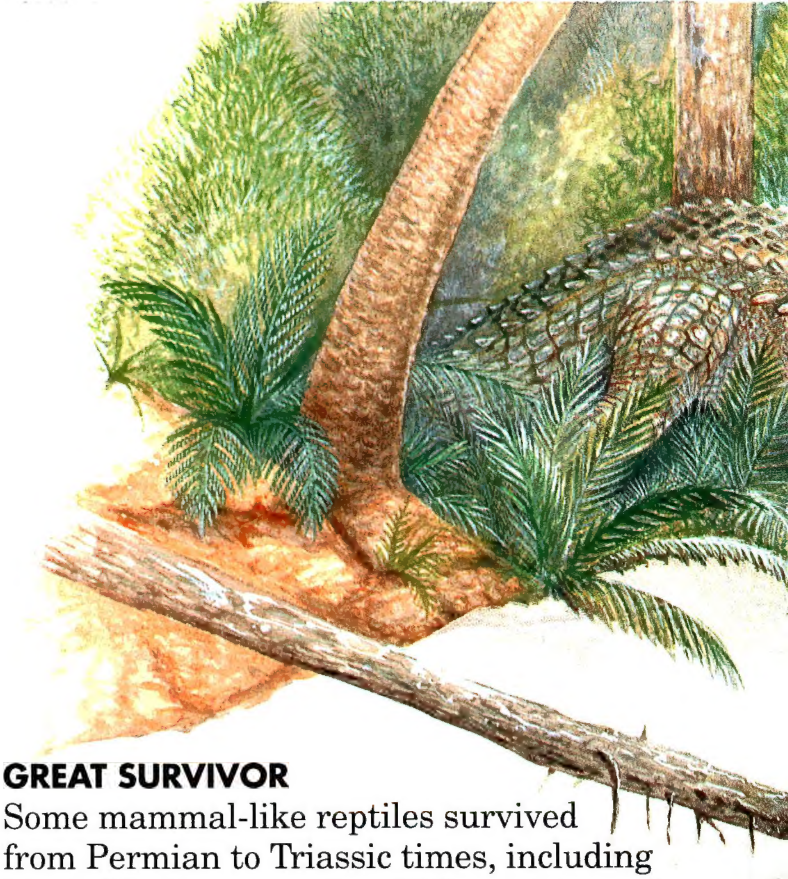
At the start of the Triassic, new creatures filled this empty world. At the water's edge the first frogs, such as *Triadobatrachus,* hopped about, and turtles swam in lakes and rivers. Plants that enjoyed warm, dry conditions filled the land, and ferns sprang up by the ponds. Palm-like cycads grew, and above them stood tall conifers.

NEW BEGINNINGS

With so few species left, the early Triassic was a time of great change. During this Period the archosaurs, the 'ruling reptiles', took over. The weather was much less changeable than it is today. The warm, tropical climate suited reptiles well, and they were able to travel all over the world, which was still one supercontinent.

Is it true that the first mammals lived in the Triassic Period?

Yes. Tiny, shrew-like creatures such as *Morganucodon* (mor-gan-ook-o-don) lived about 215 million years ago. It probably hunted at night and preyed on insects and other small animals. Fossils of big-eyed *Morganucodon* have been found in Wales, Southern Africa and China.



GREAT SURVIVOR

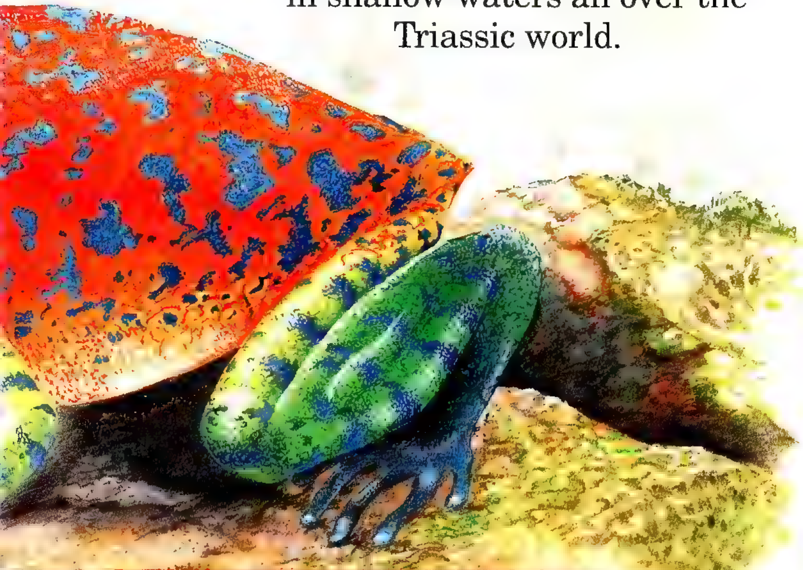
Some mammal-like reptiles survived from Permian to Triassic times, including hippo-like *Lystrosaurus*. Without too much competition from other plant-eaters and with no big oceans to cross, *Lystrosaurus* could roam freely and was the most common reptile in the Early Triassic.

***Triadobatrachus*, an early frog, enjoying life near the water. The early frog fossil, shown right, was found in Spain.**

***Shansisuchus* was a fearsome meat-eater.**

GONE FISHING

Triassic seas were very busy. Swimming, fish-eating reptiles, such as *Nothosaurus,* paddled along with their arms and legs and pierced their prey with sharp teeth. Dolphin-like ichthyosaurs, such as *Mixosaurus* and *Ophthalmosaurus,* swam in shallow waters all over the Triassic world.



Plants in the Triassic landscape included horsetails, gingkos, ferns and conifers.

ROOTING ABOUT

Rhynchosaurs, such as *Scaphonyx,* thrived from the Mid to Late Triassic Period. *Scaphonyx* was able to scratch up tough roots with its hind feet and little tusks.

SOCKET-TOOTHED REPTILES

The most important reptiles in the Triassic were the flesh-eating thecodonts – 'socket-toothed reptiles'. This group gave rise to the crocodilians, dinosaurs and pterosaurs. *Shansisuchus* was an early thecodont. It was the biggest animal alive at the time, and a fearsome meat-eater. *Euparkeria* was a smaller thecodont, which sprinted after prey on its hind legs.

THE DINOSAURS ARRIVE

One of the first dinosaur groups to appear were the saurischians. This group included the large prosauropods, such as *Plateosaurus,* and flesh-eaters such as *Coelophysis*. Early ornithischians also appeared. These were small, nimble, plant-eating dinosaurs such as *Lesothosaurus*. One of the earliest dinosaurs found so far is *Eoraptor*. Many mammal-like reptiles and thecodonts, and all the rhynchosaurs, became extinct. Now dinosaurs began their 160-million-year rule.

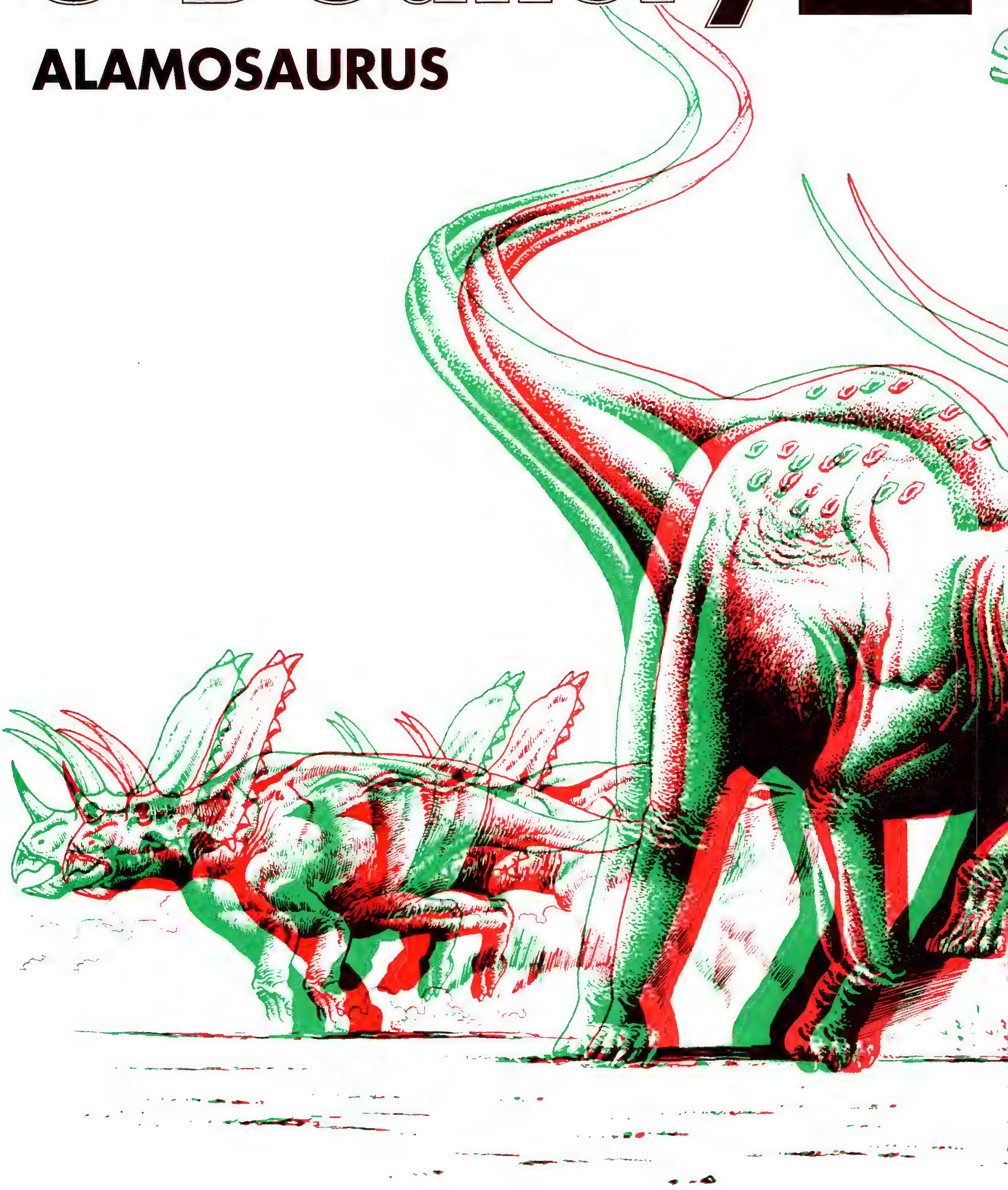
GIANTS OF THE PAST

A herd of duckbilled *Secernosaurus* is peacefully grazing in the South American jungle. Suddenly, one hears a noise and alerts the others to possible danger. They scatter – some decide to swim to safety and leap into the water, others take their chances on dry land.

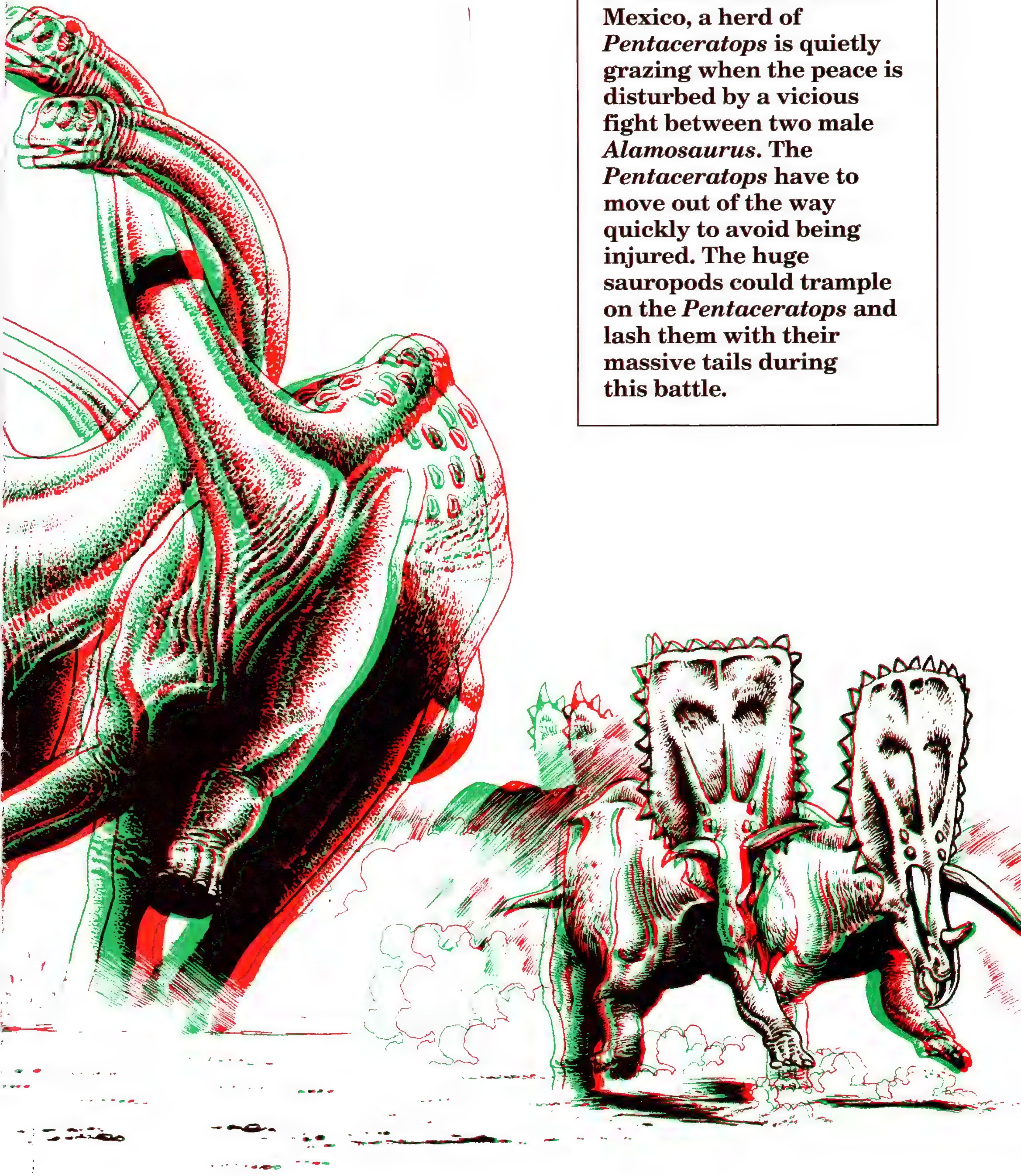
SECERNOSAURUS

3-D Gallery 78

ALAMOSAURUS



In Late Cretaceous New Mexico, a herd of *Pentaceratops* is quietly grazing when the peace is disturbed by a vicious fight between two male *Alamosaurus*. The *Pentaceratops* have to move out of the way quickly to avoid being injured. The huge sauropods could trample on the *Pentaceratops* and lash them with their massive tails during this battle.



Watch it!

Seeing is so important that many different kinds of eyes evolved millions of years ago.

Animals need good eyesight to help them survive. They have to watch out for danger and to search for food. Creatures need different kinds of eyes, depending on how and where they live. Today there is an incredible variety of eyes throughout the animal world, just as there was many millions of years ago.

MULTI-VISION

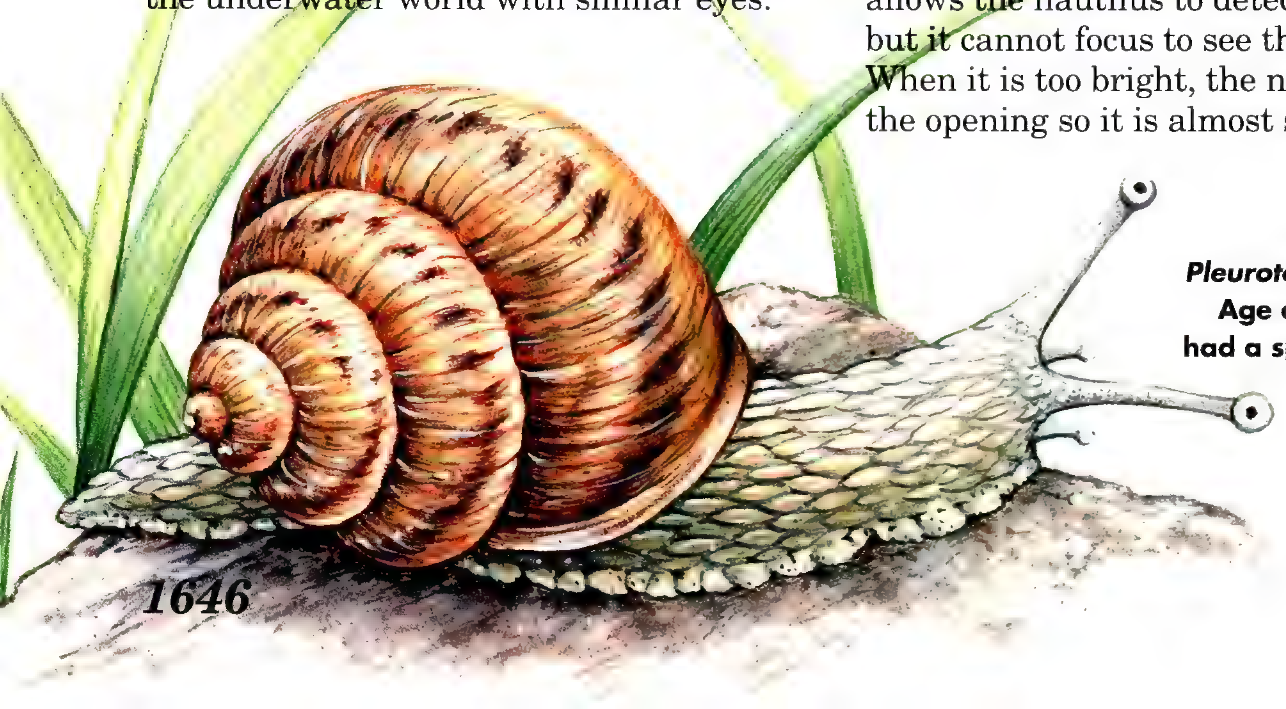
The eye of an insect is quite different from ours. It is made up of hundreds of tiny, simple eyes that all work together. This kind of eye is very good at detecting movement. A dragonfly has an amazing 30,000 tiny eyes within each eye. Over 360 million years ago giant dragonflies the size of seagulls darted about. They used their keen sight to track prey and avoid predators. In the seas, trilobites watched the underwater world with similar eyes.

UP AND ABOUT

Some creatures have eyes on stalks to help them see better. Land snails have existed since the Age of the Dinosaurs. Their eyes are on the tips of their 'horns'. Swimming scallops have survived for millions of years, too. Each scallop has many tiny eyes that are dotted around the edges of its shell.

SEEING IS BELIEVING

Some of the strangest eyes belong to creatures that lurk in the depths of the sea. The nautilus has hardly changed for 400 million years. It has a single eye, without a lens, which operates a bit like a very simple camera. Light enters the eye and allows the nautilus to detect movement but it cannot focus to see things distinctly. When it is too bright, the nautilus closes the opening so it is almost shut.



The primitive snail *Pleurotomaria* lived in the Age of the Dinosaurs. It had a spiral, pointed shell and eyes on the end of its horns. It was about 5cm high.

EAGLE-EYED

An eagle has incredibly sharp sight. Its eyes can pick out tiny details far smaller than we can see. It can do this because its eyes are able to magnify what it sees. They can zoom in on something, a bit like a telephoto camera lens. Today's eagle relies on good eyesight to spot movement at a great distance. If it sights a likely meal, it can then swoop in and pounce on its prey at high speed. Prehistoric birds of prey must have had extra-sharp eyes, too.

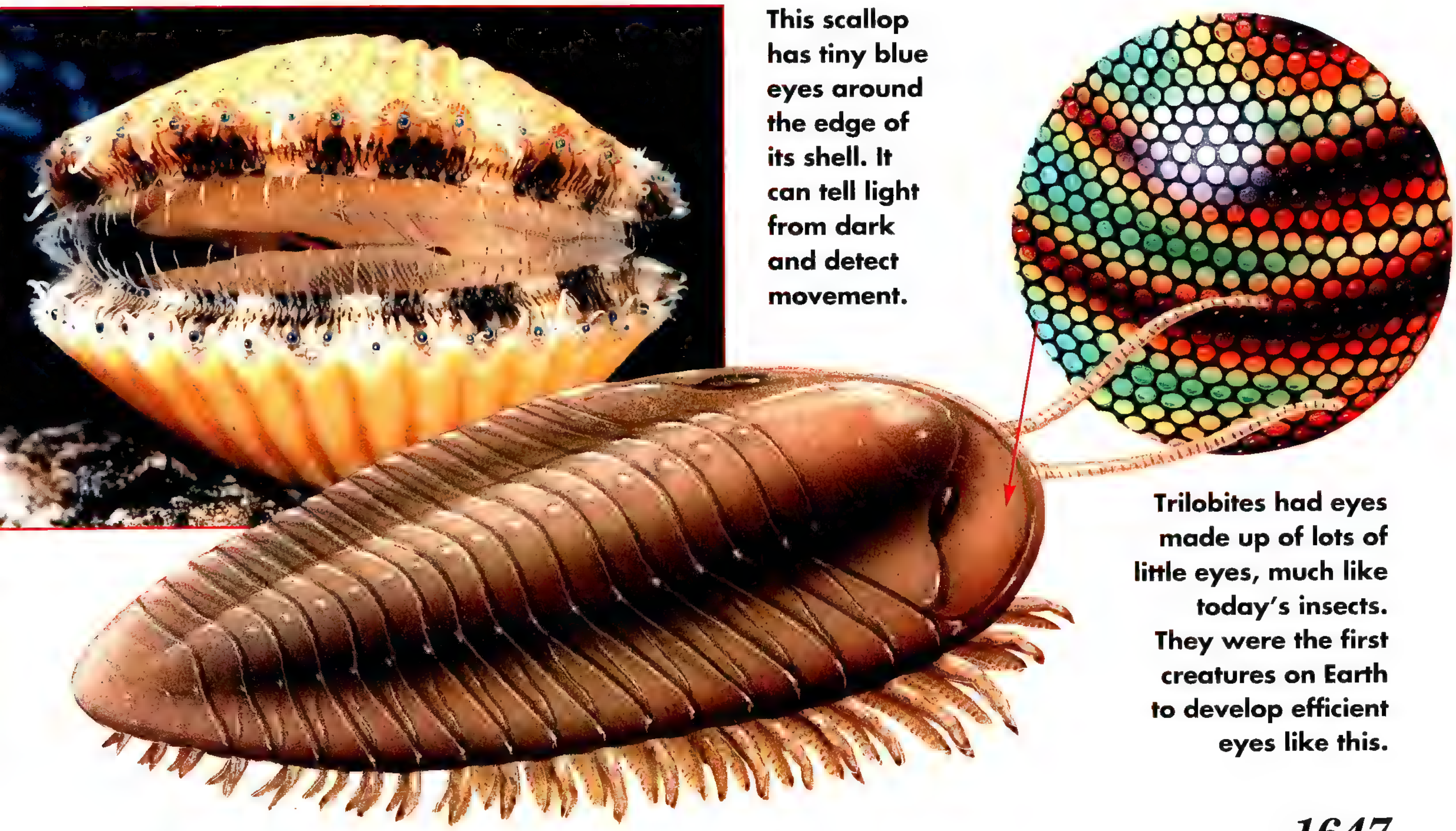
IT'S A FACT

OUT OF SIGHT

Certain creatures can see things which are invisible to us. Piranha fish have developed special sight to track prey in murky water. They can see the invisible infra-red remote-control beams that make televisions and videos work, too. Similar hunting fish existed in prehistoric times. They probably had infra-red sight as well.

SEEING IN THE DARK

Night hunters have to be able to see in the dark. Some have large eyes to help them. The tarsier monkey has survived unchanged since prehistoric times. Its eyes are so big, they fill most of its head.



This scallop has tiny blue eyes around the edge of its shell. It can tell light from dark and detect movement.

Trilobites had eyes made up of lots of little eyes, much like today's insects. They were the first creatures on Earth to develop efficient eyes like this.

Blue Babe

The amazing story of how an Ice-Age bison was found in a gold mine.

When Walter Roman began his day's work in his gold mine near Fairbanks, Alaska, USA, in 1979, he hoped he might find some gold. In fact, he found a very different sort of treasure.

BURIED TREASURE

As he hosed away the frozen mud and silt to get at the gold-bearing gravel beneath, he noticed legs and hoofs sticking out of the wall of frozen mud in front of him. Not bare bones, but the actual legs of an animal, with flesh and skin on them.

CALL IN THE EXPERTS

Walter Roman called in the palaeontologist Dale Guthrie from Fairbanks University. Guthrie began to excavate the animal from the slowly thawing ground. It was very muddy work, but eventually he uncovered an amazing mummified Ice-Age bison. It had been perfectly preserved in the frozen mud.

MUD, GLORIOUS MUD

Buried in the surrounding mud were all sorts of clues about the bison and when and how it had lived. Dale Guthrie studied the layers of mud around the mummified bison and worked out that it had lived about 36,000 years ago.

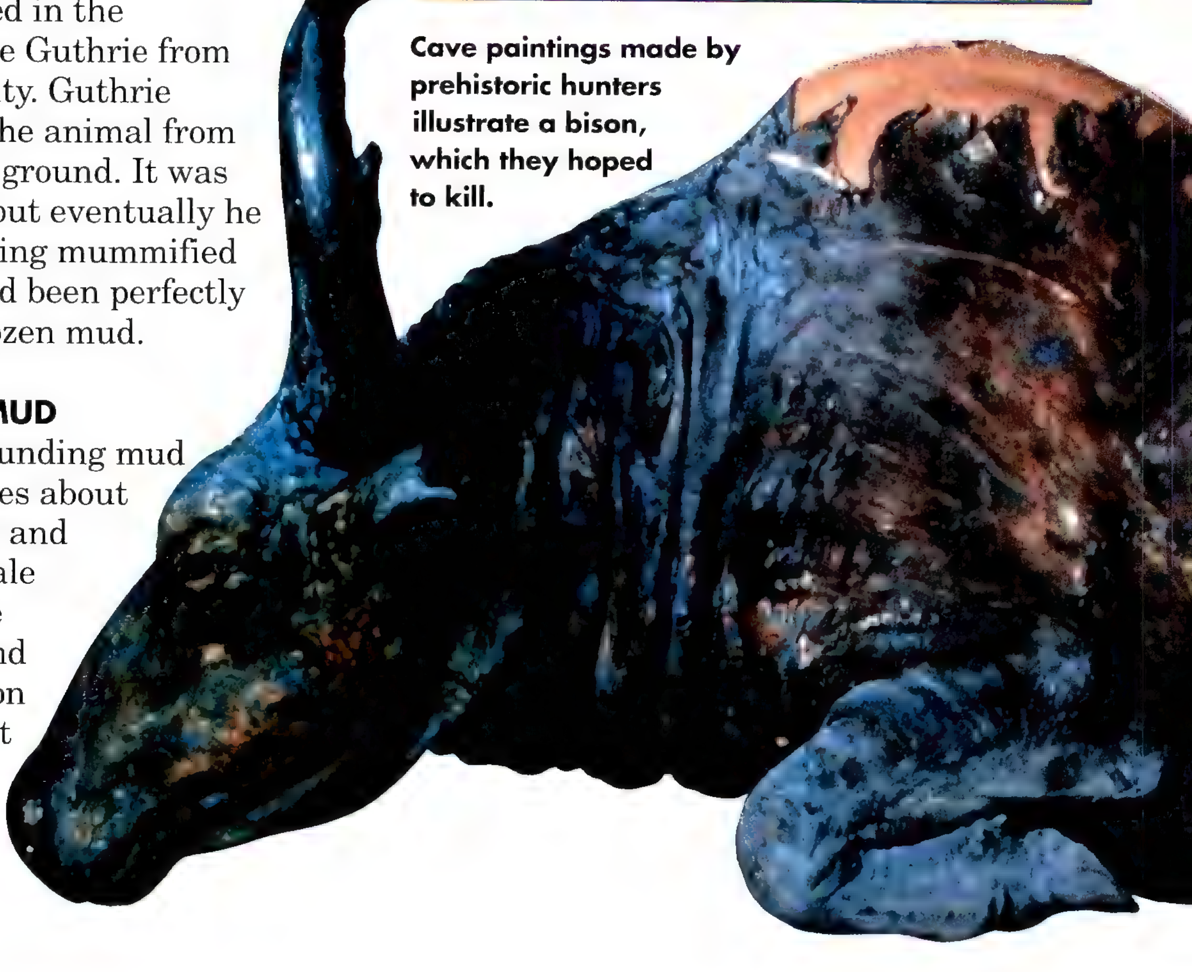
BLUE SKIN

As the bison was dug out, tiny blue spots appeared all over it. Minerals on the skin turned blue as they came into contact with air. So Guthrie named it Blue Babe.

A COLD DEATH?

At first, Guthrie thought that Blue Babe might have died of cold and starvation. But when he began to study the mummy he found clues to a different story.

Cave paintings made by prehistoric hunters illustrate a bison, which they hoped to kill.

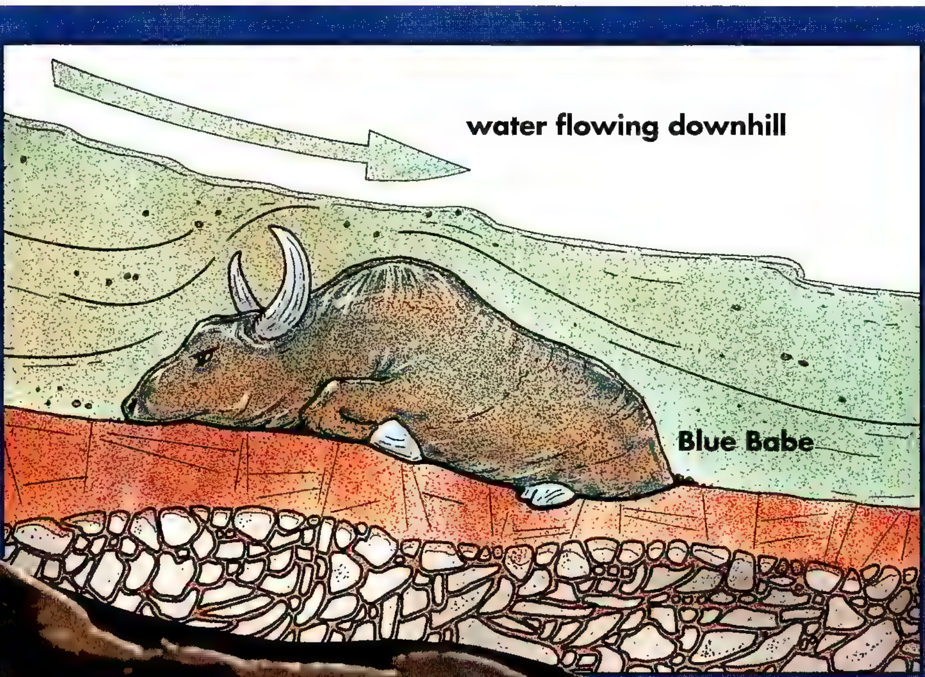


CLUE 1

Examining the mummy in his laboratory, Dale Guthrie found the marks of long, deep scratches. They were along the skin on Blue Babe's rump and they looked as if they had been made by very sharp claws. Perhaps Blue Babe had been killed by a predator. But what sort of animal could attack and kill a large bison? Wolves hunting in a pack might have been able to surround a bison weakened by cold and hunger. But wolves do not use their claws to cut and rip their prey.

What is? A MUMMY

A mummy is a dead animal or human whose flesh and skin have been preserved. This sometimes happens naturally when a carcass is frozen in the ground or dries out very quickly in desert conditions. Sometimes bodies are mummified on purpose. The ancient Egyptians mummified human and animal bodies with special chemicals to preserve them. Frozen mummies are rare. Blue Babe was the first North American mummy to be studied in detail.



Dale Guthrie has worked out how the body of Blue Babe must have been buried in order that, 36,000 years later, it could be dug out of the mud as a perfectly preserved mummy. He thinks the bison died on a slope and that the carcass was covered by cold water flowing down the incline in the spring. The cold water was full of particles of silt and earth, which gradually built up around the bison. The cold, wet silt on top of Blue Babe and the icy ground below kept the body frozen and prevented it decomposing or being attacked by scavengers.

CLUE 2

Guthrie also discovered that some tooth marks had punctured Blue Babe's hide, especially round the nose. What creature had managed to bring this huge animal down using teeth and claws? Dale Guthrie began to think about what large predators lived in Alaska 36,000 years ago.

GOT IT!

Suddenly, Dale Guthrie realised that the tooth and claw marks were those of lions. When Blue Babe was alive, lions lived in Alaska. Ice-Age Alaskan lions must have killed Blue Babe!

TOOTH DETECTIVE

The puncture marks made by teeth were exactly the same distance apart as the canine teeth of an Ice-Age lion's skull in the university museum. The teeth marks were around the nose because lions kill large prey by biting it around the nose in an air-tight grip in order to suffocate it.

PIECE OF EVIDENCE

Then a piece of a lion's tooth was found embedded in Blue Babe's thick hide. It was more proof of Guthrie's theory. It seems that one of the lions must have broken a tooth when it bit the bison.

JIGSAW COMPLETED

Gradually, Dale Guthrie completed his time-detective work using his knowledge of biology and palaeontology. He managed to fit all the jigsaw pieces of the 36,000-year-old puzzle together. This is what he worked out probably happened to Blue Babe.

THE WHOLE STORY

Long, long before the Egyptians built the pyramids or there were any people in North America, a male bison grazed. It was the beginning of an Alaskan winter. From time to time it raised its head and, with the wariness of a grass-eater, looked around.

Alaska is icy today, but was warm grassland 36,000 years ago.

Although Blue Babe was much bigger than the lions, it stood no chance against their hunting skills.

THE KILL

Suddenly, two or three lions dashed from the cover of some bushes. As the bison tried to escape, one of them leapt at its rump. The lion didn't miss the slow-moving bison. Its claws sunk deep into its side and brought it crashing down. Another lion swiftly closed its jaws in an airtight grip on the bison's nose. In spite of Blue Babe's frantic struggles, the lion hung on tightly. Soon the lack of air meant the bison stopped breathing.

FROZEN DINNER

The lions must have fed on the carcass of the bison immediately because some of its flesh was missing and its skin was torn down the back. However, even hungry lions could not finish the bison at one sitting. They returned several times to feed, but the carcass froze in the cold and the lions gave up after one of them broke a tooth on the frozen meat.

BLUE GOLD

So Blue Babe was left to be covered with fine earth when the spring rains washed down. The frozen earth and the layers of covering mud preserved this Ice-Age bison for about 36,000 years until a miner found it in his gold mine.

BLUE BABE FROZEN AGAIN

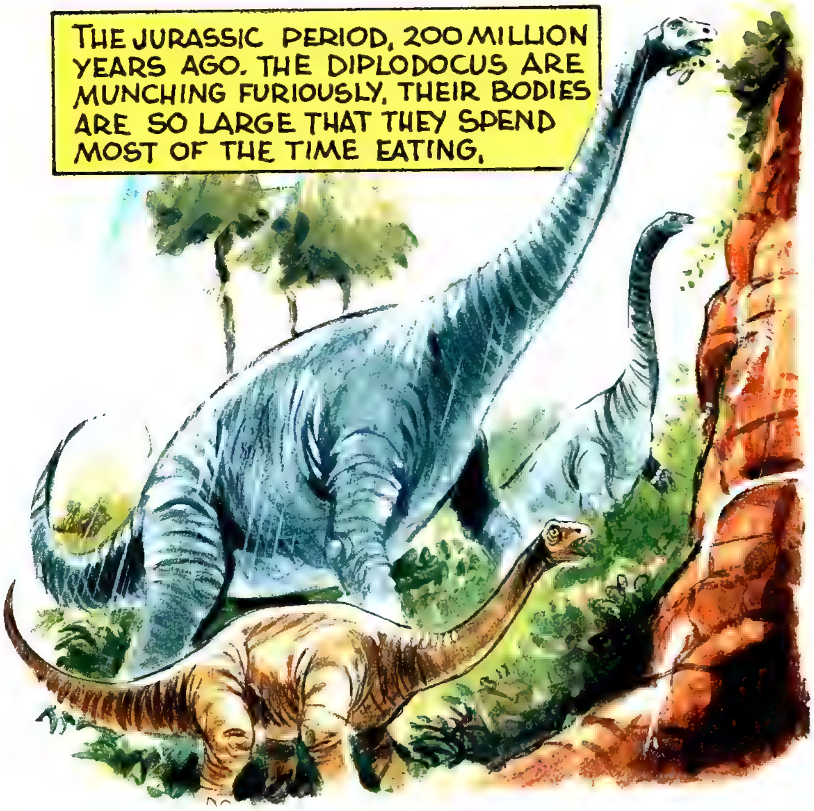
When Guthrie first excavated the bison he put it in a freezer for a year while he did further research. His work has led him to believe that, when Blue Babe lived, Alaska was not a frozen desert but had grasslands rich in animal life.

Is it true that there are no lions in Alaska today?

Yes. Although lions can live in quite cold climates, they need to live where there is plenty to eat. That is why today's lions can live in Africa, where there is plenty of prey, but not in Alaska, where there is very little. There probably weren't very many lions in Alaska in Blue Babe's time either. Alaskan lions were about the same size as today's African lions, but they did not have large, shaggy manes.

A DAY IN THE LIFE OF DIPLODOCUS

THE JURASSIC PERIOD, 200 MILLION YEARS AGO. THE DIPLODOCUS ARE MUNCHING FURIOUSLY. THEIR BODIES ARE SO LARGE THAT THEY SPEND MOST OF THE TIME EATING.

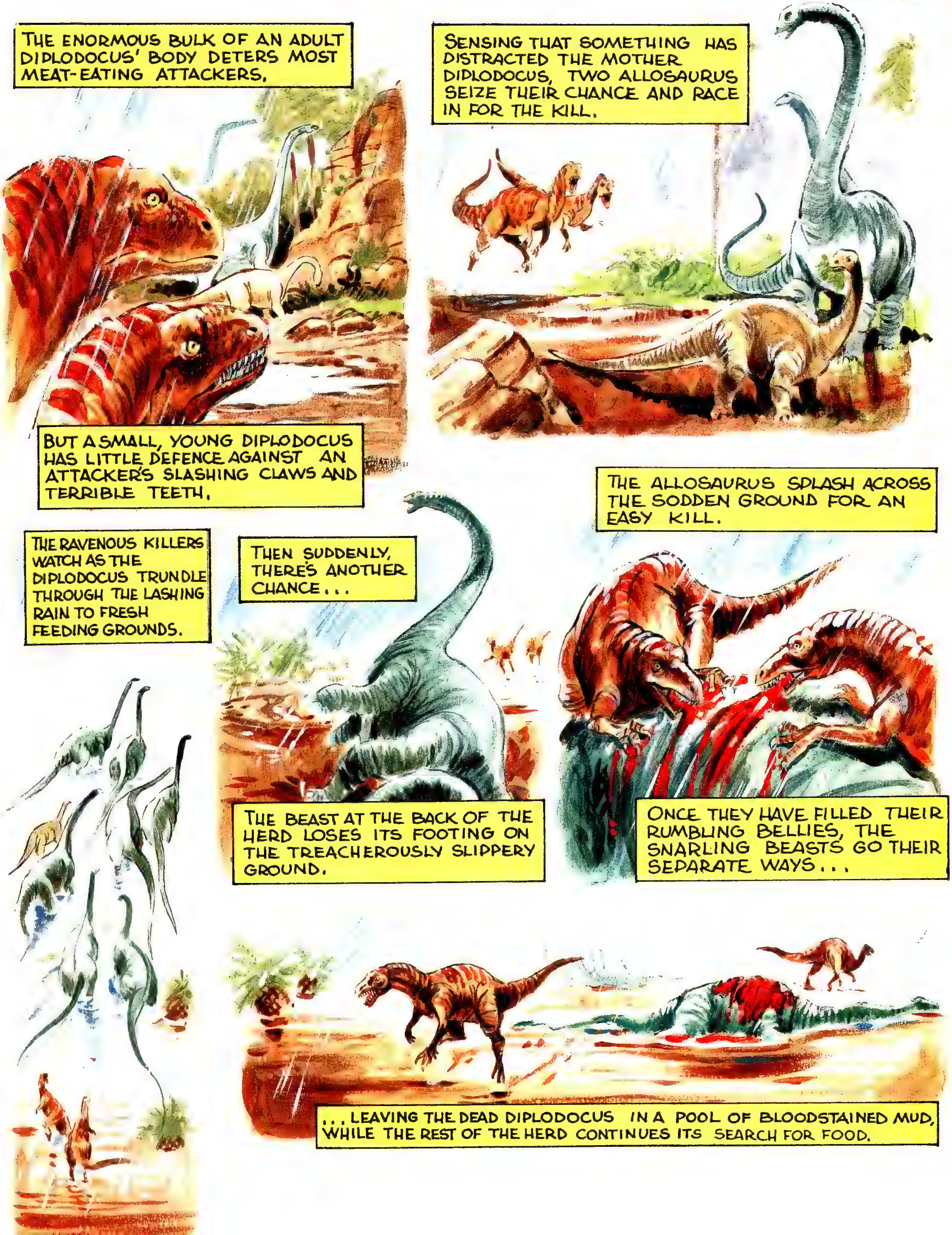


ONE OF THE FEMALES HAS A YOUNG ONE WITH HER.

THE LITTLE DIPLODOCUS KNOWS INSTINCTIVELY HOW TO PULL PLANTS INTO ITS MOUTH BY GRIPPING THEM WITH ITS PEG-LIKE TEETH AND GULPING THEM DOWN WHOLE.

BUT THE MOTHER DIPLODOCUS HEARS THEM SPLASHING TOWARDS HER AND, QUICK AS A FLASH, SHE LASHES OUT WITH HER MIGHTY TAIL, SENDING AN ALLOSAURUS REELING BACKWARDS.

ALERTED BY THE NOISE, ANOTHER DIPLODOCUS LANDS A BRUISING BLOW IN THE OTHER ALLOSAURUS' GUT WITH THE SPECIAL SHARP CLAWS ON ITS INNER FRONT TOES.


THE ENORMOUS BULK OF AN ADULT DIPLODOCUS' BODY DETERS MOST MEAT-EATING ATTACKERS.
BUT A SMALL, YOUNG DIPLODOCUS HAS LITTLE DEFENCE AGAINST AN ATTACKER'S SLASHING CLAWS AND TERRIBLE TEETH.
SENSING THAT SOMETHING HAS DISTRACTED THE MOTHER DIPLODOCUS, TWO ALLOSAURUS SEIZE THEIR CHANCE AND RACE IN FOR THE KILL.
THE RAVENOUS KILLERS WATCH AS THE DIPLODOCUS TRUNDLE THROUGH THE LASHING RAIN TO FRESH FEEDING GROUNDS.
THEN SUDDENLY, THERE'S ANOTHER CHANCE . . .
THE BEAST AT THE BACK OF THE HERD LOSES ITS FOOTING ON THE TREACHEROUSLY SLIPPERY GROUND.
THE ALLOSAURUS SPLASH ACROSS THE SODDEN GROUND FOR AN EASY KILL.
ONCE THEY HAVE FILLED THEIR RUMBLING BELLIES, THE SNARLING BEASTS GO THEIR SEPARATE WAYS . . .
. . . LEAVING THE DEAD DIPLODOCUS IN A POOL OF BLOODSTAINED MUD, WHILE THE REST OF THE HERD CONTINUES ITS SEARCH FOR FOOD.

Improve and test your knowledge with...

FACT FILE

Fascinating facts to read and 10 fun questions to answer!

Fossils bombed

Many important fossils were destroyed when museums were bombed during air raids in World War II. These include the original specimens of *Spinosaurus* and *Poekilopleuron*.

1 What does *Secernosaurus* mean?
- a) scissor teeth
- b) separate reptile
- c) swimming reptile

2 Which fossil-rich country was *Elaphrosaurus* found in?
- a) Tanzania
- b) Argentina
- c) France

3 *Secernosaurus* was the first South American:
- a) sauropod
- b) stegosaur
- c) hadrosaur

4 *Megaloceros* had big horns:
- a) for fighting
- b) for flying
- c) for showing off

5 During the Permian Period, the world became:
- a) wetter
- b) colder
- c) drier

6 When did the first dinosaurs appear?
- a) during the Triassic
- b) during the Permian
- c) during the Jurassic

7 What was *Alamosaurus'* best weapon?
- a) its fierce eyes
- b) its massive tail
- c) its giant horns

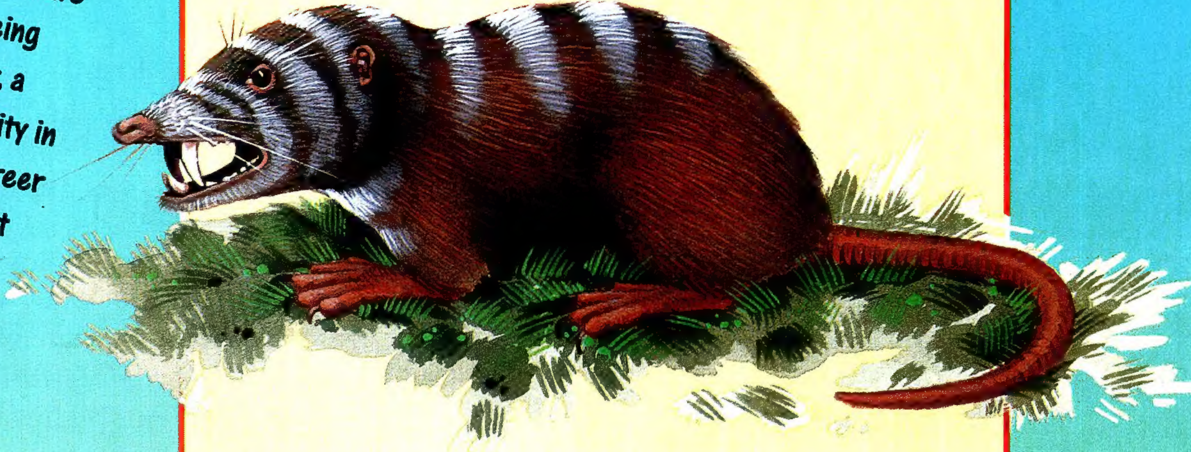
8 Prehistoric snails had eyes:
- a) on either side of a nose
- b) on horns
- c) in the back of their heads

9 What killed Blue Babe?
- a) lions
- b) cold and hunger
- c) bears

A cruel trick

In the early 1700s, the true nature of fossils was only just being realised. Johann Beringer, a lecturer at Wurzburg University in Germany, spent much of his career studying a series of fossils that turned out to be hoaxes manufactured by his colleagues.

Slasher shrew



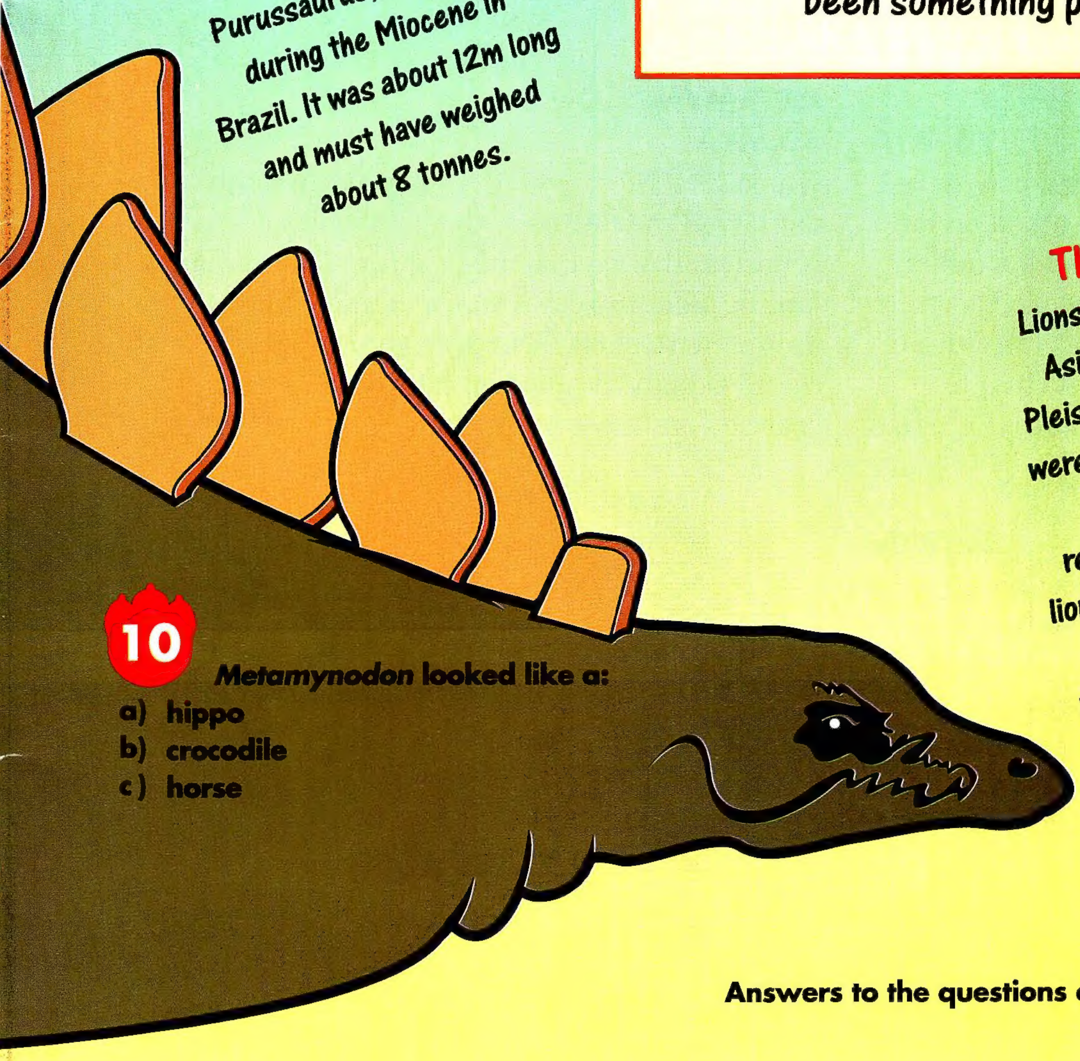
In Oligocene Nebraska, USA, there lived a kind of sabre-toothed shrew. It was called Sinclairella and was about the size of a squirrel. No one really knows what it ate with its sabre-like incisor teeth, but it must have been something pretty special!

Heavy croc

The most massive crocodile yet discovered is Purussaurus, which lived during the Miocene in Brazil. It was about 12m long and must have weighed about 8 tonnes.

The mane chance

Lions roamed across Europe, Asia and North America in Pleistocene times. These lions were maneless. Manes are only useful as symbols of recognition and leadership if lions live in large prides, as they do in Africa today. On the northern continents in the Ice Age, food would have been too scarce for lions to live in big groups.



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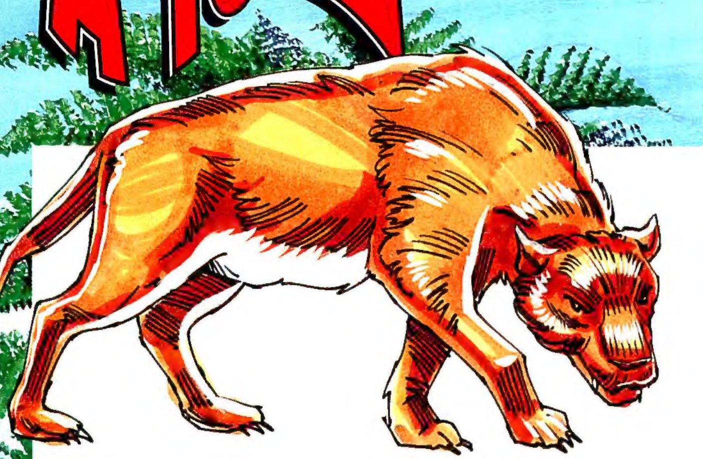
***Metamynodon* looked like a:**
- a) hippo
- b) crocodile
- c) horse



MEGISTOTHERIUM **26 MYA**

Megistotherium (me-gist-oh-thee-ree-um) may have been the largest ever flesh-eating mammal – it had huge canine teeth for ripping through the flesh of its prey. It weighed as much as four lions and had a head almost twice the size of a bear's. *Megistotherium* lived in Miocene times in Libya, North Africa, and hunted elephant-like mastodonts such as *Platybelodon*.

MERYCHIPPUS **20 MYA**

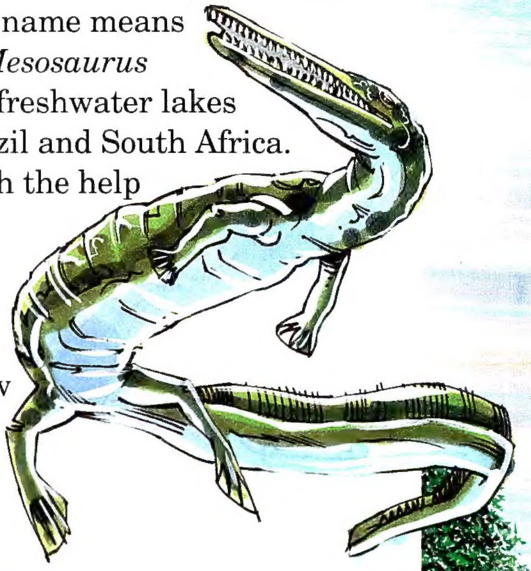
Merychippus (me-ri-kip-us) was a pony-sized horse from North America. It walked on its large, hoofed, middle toe and had a smaller, higher toe on each side. Long-necked *Merychippus* had ridged teeth at the sides of its mouth that helped it chew the tough grasses that grew in Miocene times. Its name means 'grazing horse'.

MESOHIPPUS **35 MYA**

Mesohippus (me-zoh-hip-us) was an early horse. It had longer legs than the first known horse, dog-sized *Hyracotherium*, and grew to be almost twice its size. *Mesohippus* was a dainty-looking horse with slender limbs and a long, straight back. It lived from Early to Mid Oligocene times and its name means 'middle horse'.

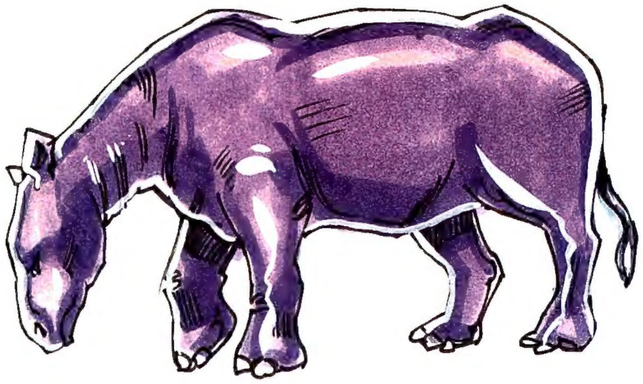
MESOSAURUS **265 MYA**

Mesosaurus (me-zoh-saw-rus) was a small, swimming reptile about as long as an adult human's arm. Its name means 'middle reptile'. *Mesosaurus* lived in Permian freshwater lakes and ponds in Brazil and South Africa. It chased fish with the help of paddle-shaped limbs and a deep tail. *Mesosaurus* snapped up fish in its long, narrow jaws and speared them with its sharp teeth.



METAMYNODON
30 MYA

Hippo-like *Metamynodon* (met-ah-mine-oh-don) lived in Oligocene times in North America. It was a member of the rhinoceros family. *Metamynodon* was a chunky, heavy animal with short, sturdy legs to support its rounded body. It stood on four broad feet and browsed on forest plants.



MYA = MILLION YEARS AGO

COMING IN PART 70

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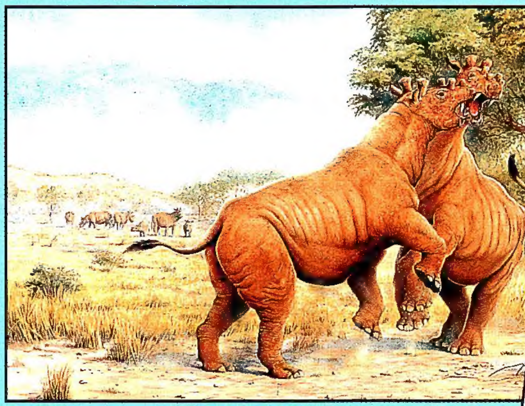

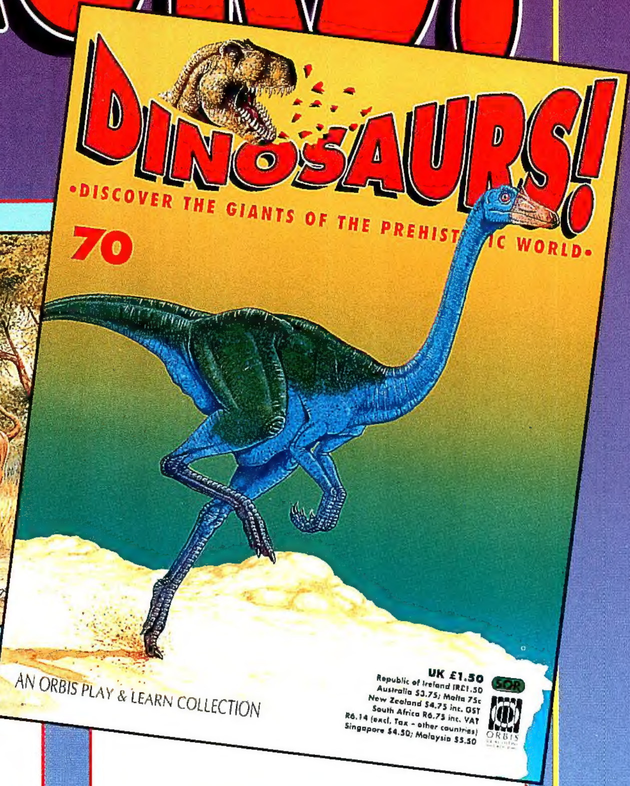
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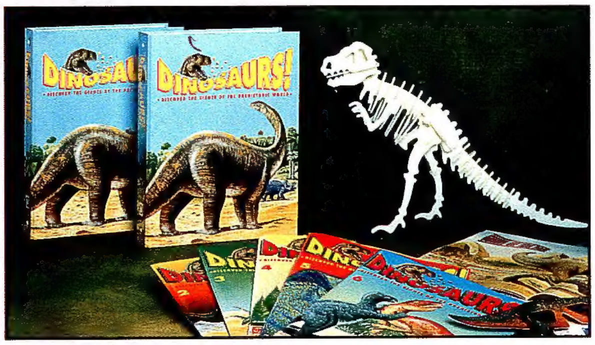

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PLUS

ASK THE EXPERT – your questions answered by Dr David Norman
And
TIME DETECTIVE
HISTORY IN PICTURES
3-D GALLERY

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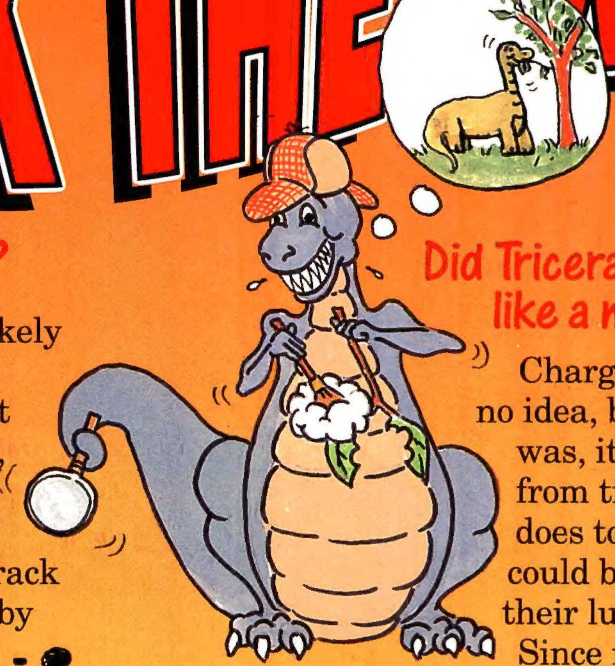
ANSWERS TO FACT FILE QUESTIONS: 1.b 2.a 3.c 4.c 5.c 6.a 7.b 8.b 9.a 10.a

Dr David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

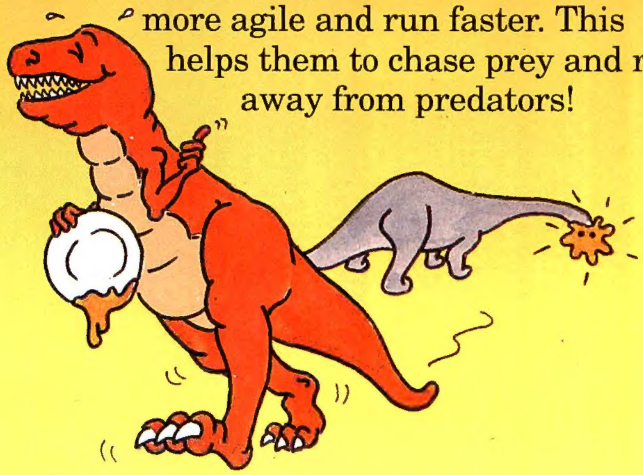


Was T rex clever?

This dinosaur is unlikely to have been considered intelligent by human standards, but it would have been a natural hunter, and able to track and capture its prey by anticipating its movements, just like hunters today. If this is a measure of intelligence then, yes, it was bright. However, when people attach labels such a 'bright' or 'dim' to an animal, it is meaningless in the natural world. Animals use their intelligence to solve the problems they face in their daily lives.

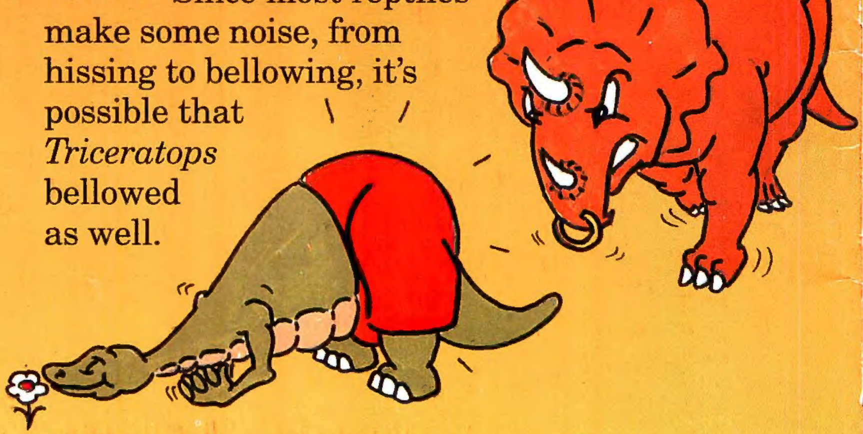
Why did some dinosaurs walk on two legs?

Walking on two legs helps an animal to be more agile and run faster. This helps them to chase prey and run away from predators!



Did Triceratops charge and bellow like a modern-day bull?

Charging and bellowing? I have no idea, but being built the way it was, it may well have charged from time to time, just as a bull does today. Whether or not they could bellow would depend upon their lungs and voice box. Since most reptiles make some noise, from hissing to bellowing, it's possible that *Triceratops* bellowed as well.



Did any dinosaurs eat grass?

No, dinosaurs did not eat grass. There is a simple reason for this, and that is that grass just did not exist during the Age of the Dinosaurs. Grasses appear to have evolved in the middle of the Tertiary Period, tens of millions of years after the dinosaurs had died out. Grasses went on to form the main diet of many mammals, such as horses.

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